

I claim:

1. A cooling system for an engine, comprising:

an engine having a plurality of cylinders, said plurality of cylinders being
5 aligned with each other without a coolant conduit extending completely between
adjacent ones of said plurality of cylinders;

a first cooling passage configured to direct a first stream of coolant in
thermal communication with each of said plurality of cylinders;

a cavity formed adjacent to and in fluid communication with said first
10 cooling passage; and

a downstream protuberance, formed at a first intersection of a surface of said
first cooling passage and a surface of said cavity, to induce a portion of said first
stream of coolant within said first cooling passage to join a vortical flow of coolant
within said cavity.

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2. The system of claim 1, further comprising:

an upstream protuberance, formed at a second intersection of said
surface of said first cooling passage and said surface of said cavity, to align a
portion of said vortical flow within said cavity with said first stream of coolant
20 within said first cooling passage to facilitate the return of said portion of said
vortical flow within said cavity back into said first stream of coolant within first
cooling passage, said plurality of cylinders is aligned along an axis which extends
through the centers of said plurality of cylinders.

25 3. The system of claim 2, wherein:

said first cooling passage changes direction at a first region from a first direction generally toward said axis to a second direction generally away from said axis.

5 4. The system of claim 3, wherein:

said cavity is disposed proximate said first region.

5. The system of claim 1, wherein:

10 said cooling system is an open cooling system wherein water is drawn from a body of water, directed into said first cooling passage, and then returned to said body of water.

6. The system of claim 1, wherein:

said cylinders are configured with solid bore bridges therebetween.

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7. The system of claim 1, further comprising:

a second cooling passage configured to direct a second stream of coolant in thermal communication with each of said plurality of cylinders.

20 8. A cooling system for an engine, comprising:

an engine having a plurality of cylinders, said plurality of cylinders being aligned with each other without a coolant conduit extending completely between adjacent ones of said plurality of cylinders;

25 a first cooling passage configured to direct a first stream of coolant in thermal communication with each of said plurality of cylinders, said cooling system being an open cooling system, wherein water is drawn from a body of

water, directed into said first cooling passage, and then returned to said body of water;

a vortex enhancing cavity formed adjacent to and in fluid communication with said first cooling passage; and

5 an upstream protuberance, formed at a second intersection of said surface of said first cooling passage and said surface of said cavity, to align a portion of said vortical flow within said cavity with said first stream of coolant within said first cooling passage to facilitate the return of said portion of said vortical flow within said cavity back into said first stream of coolant within first cooling passage.

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9. The system of claim 8, wherein:

a downstream protuberance, formed at a first intersection of a surface of said first cooling passage and a surface of said cavity, to induce a portion of said first stream of coolant within said first cooling passage to join a vortical flow of
15 coolant within said cavity, said cylinders being configured with solid bore bridges therebetween.

10. The system of claim 9, wherein:

said plurality of cylinders is aligned along an axis which extends through the
20 centers of said plurality of cylinders.

11. The system of claim 10, wherein:

said first cooling passage changes direction at a first region from a first direction generally toward said axis to a second direction generally away from said
25 axis.

12. The system of claim 11, wherein:

said cavity is disposed proximate said first region.

13. The system of claim 12, further comprising:

5 a second cooling passage configured to direct a second stream of coolant in thermal communication with each of said plurality of cylinders.

14. A cooling system for an engine, comprising:

an engine having a plurality of cylinders, said plurality of cylinders being aligned with each other, said cylinders being configured with solid bore bridges
10 therebetween without a coolant conduit extending completely between adjacent ones of said plurality of cylinders;

a first cooling passage configured to direct a first stream of coolant in thermal communication with each of said plurality of cylinders, said cooling system being an open cooling system, wherein water is drawn from a body of
15 water, directed into said first cooling passage, and then returned to said body of water;

a vortex enhancing cavity formed adjacent to and in fluid communication with said first cooling passage;

a downstream protuberance, formed at a first intersection of a surface of said
20 first cooling passage and a surface of said cavity, to induce a portion of said first stream of coolant within said first cooling passage to join a vortical flow of coolant within said cavity;

an upstream protuberance, formed at a second intersection of said surface of said first cooling passage and said surface of said cavity, to align a portion of said
25 vortical flow within said cavity with said first stream of coolant within said first cooling passage to facilitate the return of said portion of said vortical flow within said cavity back into said first stream of coolant within first cooling passage.

15. The system of claim 14, wherein:

said plurality of cylinders is aligned along an axis which extends through the centers of said plurality of cylinders.

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16. The system of claim 15, wherein:

said first cooling passage changes direction at a first region from a first direction generally toward said axis to a second direction generally away from said axis.

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17. The system of claim 16, wherein:

said cavity is disposed proximate said first region.

18. The system of claim 17, further comprising:

15 a second cooling passage configured to direct a second stream of coolant in thermal communication with each of said plurality of cylinders.

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